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peolaria, and so published it. Bulliard's plant is, however, different. It occurs in Sweden but is not as common and in spite of careful search I failed to find it. It is said to have a darker umbo and shorter spores than the true *L. metulaespora*. The plants we found were well marked by their soft appressed tomentose pileus, flocculose veil, and long spores. These were 15-20 x 5-6 mic., and were spindle shaped. The Asheville specimens have slightly shorter spores but agree in all other details with the Swedish plants. At Asheville there are three species of *Lepiota* belonging to this group, *L. metulaespora*, *floralis* and a third species upon which I am unwilling at present to express an opinion. Possibly it may prove to be the true *L. clypeolaria*, though it seems at present doubtful. *Lepiota floralis* occurs rarely in open sandy ground and seems to correspond well with Ravenel's plant, which was found in his garden from which he distributed at least three other new species, *L. oligosarcus*, *fulvaster*, and *psilopus*. These are all small species and from the specimens examined can not be well understood. I have examined two of Ravenel's specimens of *L. floralis*, one in very good preservation at Washington, the other in the herbarium at Biltmore. The spores in the latter were examined and were rather larger than the measurements given by Morgan, being 11-13 x 4-5 mic. and spindle shaped. It is worth suggesting that this species needs further investigation before its status can be considered satisfactory. The conditions under which it is found suggest very strongly that it is only a depauperate form of *L. metulaespora*. An almost unbroken series of forms can be found in this region connecting the two species, and the points of difference are such as may well be explained by the fact that one form is found in sheltered places in woods and the other in sterile sandy soil in open places.

NEW GENERA OF UREDINALES.

BY J. C. ARTHUR.

As the rusts are more carefully studied, and increased attention is given to the minute details of their structure, it becomes possible to find characters which enable one to group the species under genera that show relationship better than by the earlier method of using some obvious character to place many diverse forms under a few genera. The rusts are minute plants, and the diagnostic characters must be sought for with a corresponding minutia. In addition to the strictly morphological characters, the recognition of the invariable relation of the pycnia to the other spore-forms, by which it is possible to judge with much certainty of the nature of the life-cycle, has made it feasible to draw from

the whole set of spore-forms in assembling the characters held in common. In addition to these two sources of information regarding relationship sufficient knowledge of the whole body of *Uredinales* is now available so that some importance must be attached to the *pari passu* relationship of the host on which the fungus occurs.

In establishing the following genera these three points of view for determining relationship have been taken into account, *viz.*, morphological characters, life-cycle, and family of the host.

POLIOMA Arthur gen. nov.

Cycle of development includes pycnia and telia, both sub-epidermal.

Pycnia flask-shaped or globoid, central cavity usually large, ostiolar filaments apparently wanting.

Telia erumpent, somewhat indefinite, without peridium or paraphyses; teliospores pedicelled, two-celled, wall very pale or colorless, homogeneous, smooth, one pore in each cell and apical. Spores usually germinate upon maturity.

Type species: *Puccinia nivea* Holw., on *Salvia purpurea* Cav. Genus related to *Eriosporangium*, but without as many spore-forms. The generic name is taken from the Greek for *grayness*, in allusion to the usual appearance of the telial sori.

Polioma nivea (Holw.) Arthur nom. nov.

Puccinia nivea Holway, Jour. Mycol. 11:158, 1905. On *Salvia purpurea* Cav., Oaxaca, Mex., Oct. 21, 1899, 3696, and Nov. 11, 1893, 5378, *E. W. D. Holway*

Polioma griseola (Lagerh.) Arthur nom. nov.

Puccinia griseola Lagerh., in Sydow, Monog. Ured. 1:296, 1902. On *Salvia* sp., Ecuador.

Polioma delicatula Arthur sp. nov.

O. Pycnia unknown.

III. Telia hypophyllous, scattered or somewhat confluent in compact groups, round, 0.3-0.4 mm. across, soon naked, pulvinate, dirty white, becoming cinereous by germination, ruptured epidermis not noticeable; teliospores oblong or lanceolate-oblong, rounded or obtuse at apex, 12-15 x 40-48 μ , slightly or not constricted at septum, wall colorless, medium thin, 1-2 μ , not thickened above, smooth; pedicel hyaline, short.

On *Salvia elegans* Vahl., Sacred Mt., Amecameca, Mex., Oct. 20, 1903, *E. W. D. Holway*, 5200. Differs from *P. griseola* in the smaller spores without apical thickening.

SPIRECHINA Arthur sp. nov.

Cycle of development imperfectly known; only uredinia and telia recognized, both subepidermal, but judging from analogy also possessing subcuticular pycnia.

Uredinia erumpent, definite, without peridium or paraphyses; urediniospores borne singly on pedicels, ellipsoid, wall nearly colorless, echinulate-verrucose, pores obscure; contents colored.

Telia erumpent, definite, without peridium or paraphyses; teliospores borne singly on pedicels, obovate, one-celled, wall nearly or quite colorless, smooth, pore apical.

Spirechina Loeseneriana (P. Henn.) Arthur nom. nov.

Uredo Loeseneriana P. Henn. Hedwigia 37:273, 1898.

O. Pycnia unknown.

II. Uredinia amphigenous, often forming firm, more or less globular excrescences 3-20 mm. across, pulvinate, soon naked, pulverulent, bright orange-yellow fading to pale yellow, sometimes confluent, ruptured epidermis noticeable; urediniospores ellipsoid or obovate-oblong, $16-26 \times 19-40\mu$; wall pale yellow, $1.5-2.5\mu$ thick, thicker above, $3-5\mu$, echinulate-verrucose with rather fine tubercles closely set in spiral rows $2-3\mu$ apart, pores obscure.

III. Telia chiefly hypophyllous, scattered, small, 0.1-0.2 mm. across, soon naked, pulverulent, becoming pale yellow or whitish, ruptured epidermis not noticeable; teliospores narrowly obovate or oblong, $16-19 \times 42-48\mu$, usually germinating upon maturity; wall nearly or quite colorless, $1-1.5\mu$ thick, thicker above, $3-5\mu$, smooth; pedicel colorless, short.

On *Rubus Bogotensis* H. B. K. Yungas, Bolivia, 1890, *A. Miquel Bang* 684 (type); *Rubus* sp., St. Catharine, Serra Geral, Brazil, January, 1891, *E. Ule* 1656; Jalambohoch, Dept. of Huehuetenango, Guatemala, August 22, 1896, *C. & E. Seler*, 2687 (type of *Uredo Loeseneriana*). The type specimen from South America was detected by the writer in the phanerogamic collection of the Field Museum in Chicago, upon sheet no. 77528. The spiral markings of the urediniospores naturally suggest the similar markings on the urediniospores of *Pileolaria*. The teliospores are in both cases one-celled. Yet these resemblances are doubtless superficial, and while they would consign both genera to the genus *Uromyces*, under the old system of single characters, the genus *Pileolaria* clearly shows affinities in the direction of *Ravenelia*, while *Spirechina* is closely related to *Kuehneola*, its chief difference being the one-celled teliospores. The generic name is taken from the Greek for *spiral* and *prickly husk*.

PROSPODIUM Arthur gen. nov.

Cycle of development includes pycnia, uredinia and telia, all subcuticular.

Pycnia hemispherical, hymenium flat, without ostiolar filaments.

Uredinia early naked, encircled by paraphyses; urediniospores borne singly on pedicels, wall colored, echinulate, often with a hygroscopic layer.

Telia eruptent, surrounded more or less by paraphyses; teliospores two-celled by transverse septum, wall colored, with a thin, hygroscopic, hyaline layer, sparsely papillose, pores one in each cell, apical in upper cell, near the pedicel in lower cell; pedicel refractive, usually appendaged.

Type species: *Puccinia appendiculata* Wint., on *Bignoniaceae*. This genus is related to *Uropyxis* by its subcuticular pycnia, encircling paraphyses in the uredinia, and hygroscopic layer of the teliospores, but differs in having only one pore in each cell of the teliospores.

Prospodium appendiculatum (Wint.) Arthur nom. nov.

Puccinia appendiculata Wint. Flora 1884:262; *Puccinia ornata* Harkn. Proc. Calif. Acad. II, 2:231, 1889; *Puccinia medusaeoides* Arth., Bot. Gaz. 16:226, 1891; *Dicaeoma Stantis* Kuntze, Rev. Gen. Pl. 3:467, 1898; *Dicaeoma appendiculata* Kuntze, Rev. Gen. Pl. 3:467, 1898; *Puccinia Tecomae* Sacc. & Syd., Syll. Fung. 14:358, 1899. On *Stenolobium Stans* (L.) Don. (*Tecoma Stans* Juss., *T. sambucifolia* H. B. K.), Cuba, Mexico, South America.

Prospodium Amphilophii (D. & H.) Arthur nom. nov.

Puccinia Amphilophii Diet. & Holw., Bot. Gaz. 24:30, 1897; *Puccinia phlyctopus* Syd., Monog. Ured. 1:242, 1902. On *Pithecoctenium hexagonum* DC. (not *Amphilophium*, as originally published), Mexico.

NEPHLYCTIS Arthur gen. nov.

Cycle of development includes pycnia and telia, both subcuticular.

Pycnia hemispherical, hymenium flat, without ostiolar filaments.

Telia eruptent, without peridium or paraphyses; teliospores two-celled by transverse septum, colored, with a usually obscure hygroscopic layer, sparsely papillose, pores one in each cell, apical in upper cell, near the pedicel in lower cell; pedicels without appendages.

Type species: *Puccinia elegans* Schroet., on *Tecoma Stans* Juss. Closely related to *Prospodium*, but with fewer spore-forms, and short, unappendaged pedicels to the teliospores.

Nephlyctis elegans (Schroet.) Arthur nom. nov.

Puccinia elegans Schroet., Hennings in Hedw. 35:238, 1896.
On *Stenolobium Stans* (L.) Don (*Tecoma Stans* Juss.), Argentine, Brazil.

Nephlyctis transformans (E. & E.) Arthur nom. nov.

Puccinia transformans E. & E., Erythea 5:6, 1897; *Puccinia exitiosa* Syd. & Holw., Sydow Monog. Ured. 1:245, 1902.
On *Stenolobium Stans* (L.) Don, Lower California, Mex., Cuba, Bahama Islands. On *Stenolobium molle* (H. B. K.) Seem. (*Tecoma mollis* H. B. K.) Mexico.

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THE GENUS CORTINARIUS WITH KEY TO THE SPECIES.

BY C. H. KAUFFMAN.

The editor of the JOURNAL has asked me to furnish an account of the genus *Cortinarius* with Key to the species. What follows is given in response to this invitation. I desire to call attention to what was published in the *Bulletin of the Torrey Botanical Club*, based mainly on my study of the species found at Ithaca, N. Y. The cuts prepared for the illustration there have been kindly loaned for use here.

I quote from the same article the following:

"It is absolutely useless to pick up an old, dried specimen of *Cortinarius*, and ask any one to recognize it. Once in a while some easily known plant may be recognized in that way, but in the majority of cases old plants of different species look so much alike that it is mere guessing to say anything about them. The first thing to remember is that young, unexpanded plants must be examined as well as mature ones. Next a careful description must be made, *with special reference to the difference in the color of the gills in the young and old plants*. Then a similar comparison of the color of pileus and stem; and then a search for an annulus or universal veil, and its character. Finally, a careful test of the pileus and stem for gluten or viscosity. (One must remember that old, dry plants may lose this character.) These points are absolutely essential. In addition to the above, the following characters are often useful: the shape of the pileus; the size of the parts; the smoothness of the surface of pileus and stem; the character of the edge of the gills; the nature of the bulbous base of the stem; the appearance of the flesh. In fact, the notes can-